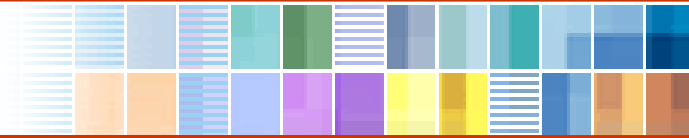


EnergyWorks: Park City Mall

Electric Distribution Transformation Program
Department of Energy Peer Review

October 28 – 30, 2003
San Diego, California

Introduction: Skip Trimble, EnergyWorks
Energy Services Hub: Sunil Cherian, Spirae
Technology Architecture: Nicholas Noecker, IBM



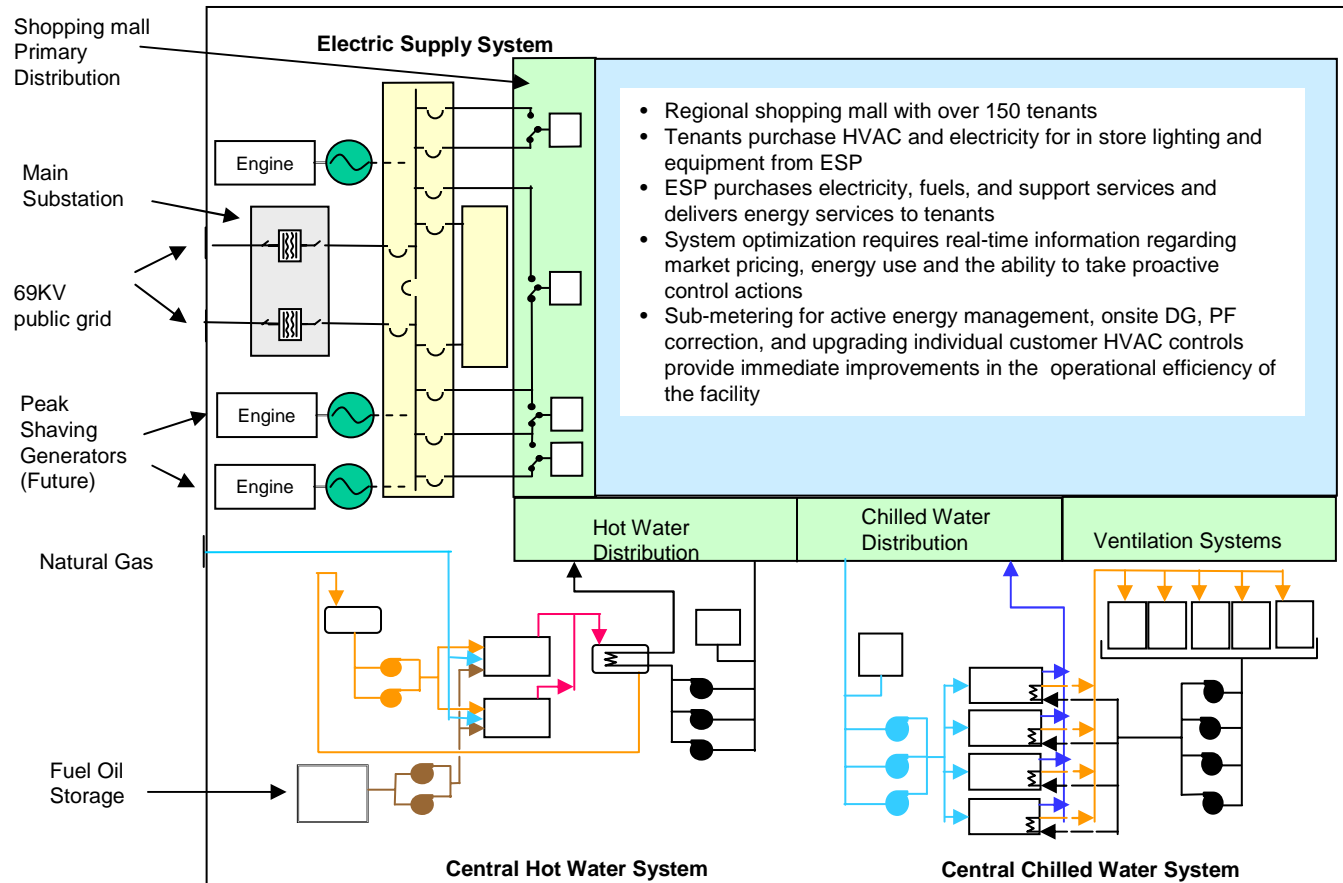
Introduction: Commercial Opportunity

Skip Trimble, EnergyWorks

Program Objectives...

- Wholesale Interconnection
 - 69 kV, DSR, PJM Data, eSchedule
- Remote Monitoring & Control of ESP Operations
 - including bidding, scheduling and settlement processes
- Remote Monitoring & Control of GenSet
- Data Security
- Multi-vendor modularity
- Market Evaluation Process and Decision Capabilities
- Automated DG Dispatch

Diagram of EnergyWorks Park City facilities





EnergyWorks—Long term Business Objectives

Standardized approach for

- Delivery of customized energy service solutions to end-users
- Operation and management of large numbers of DER assets
- DER aggregation and integration
- Interfacing with many suppliers and co-providers

Performance requirements

- Flexible end-user participation
- Scalability across diverse and geographically dispersed customer base
- Real-time response to customer and market conditions
- Low/no cost for small-scale transactions

We've assembled a multi-vendor Program Team to accomplish our objectives



Two Commercial opportunities were chosen by the team for Phase 1 and success criteria were defined


Commercial opportunities...

1. Make generation/Buy energy process – “Make/Buy”
2. Demand side response process

Success criteria...

- ✓ Capture Market Price Information
- ✓ Read GenSet Status Information
- ✓ Capture RT Demand & Develop Accurate Forecasts
- ✓ Develop Automated Make/Buy Decision Process
- ✓ Automatically Engage Generators when Necessary

High-level Project Plan



Phase I Activities	Week	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24
1. Requirements specification													
2. Conceptual design													
3. Proof-of-design test plan													
4. Interface requirements													
5. Detailed design													
6. Proof-of-design Implementation													
7. Phase II proposal and plan													
8. Phase I final report													

Future potential has been identified from our project

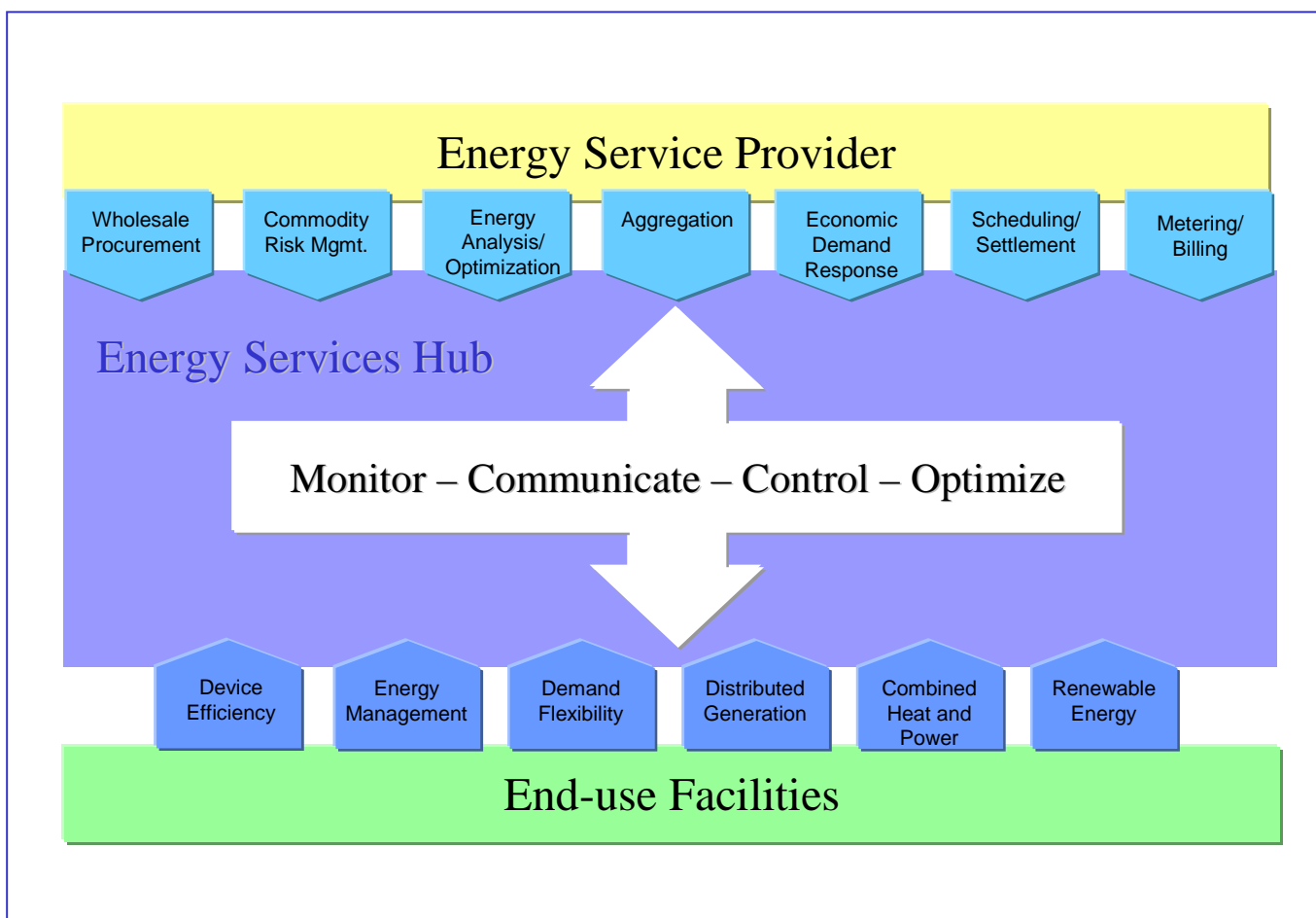
- Homeland Security implications
- Insurance Products (*financial and physical*)
- Additional Control Area Support (*e.g. black start and ancillary services*)
- New Optimization of Micro-Grids
- State and RTO Initiatives (*DG and DR*)
- End User Market Participation

The Energy Services Hub (ESH)

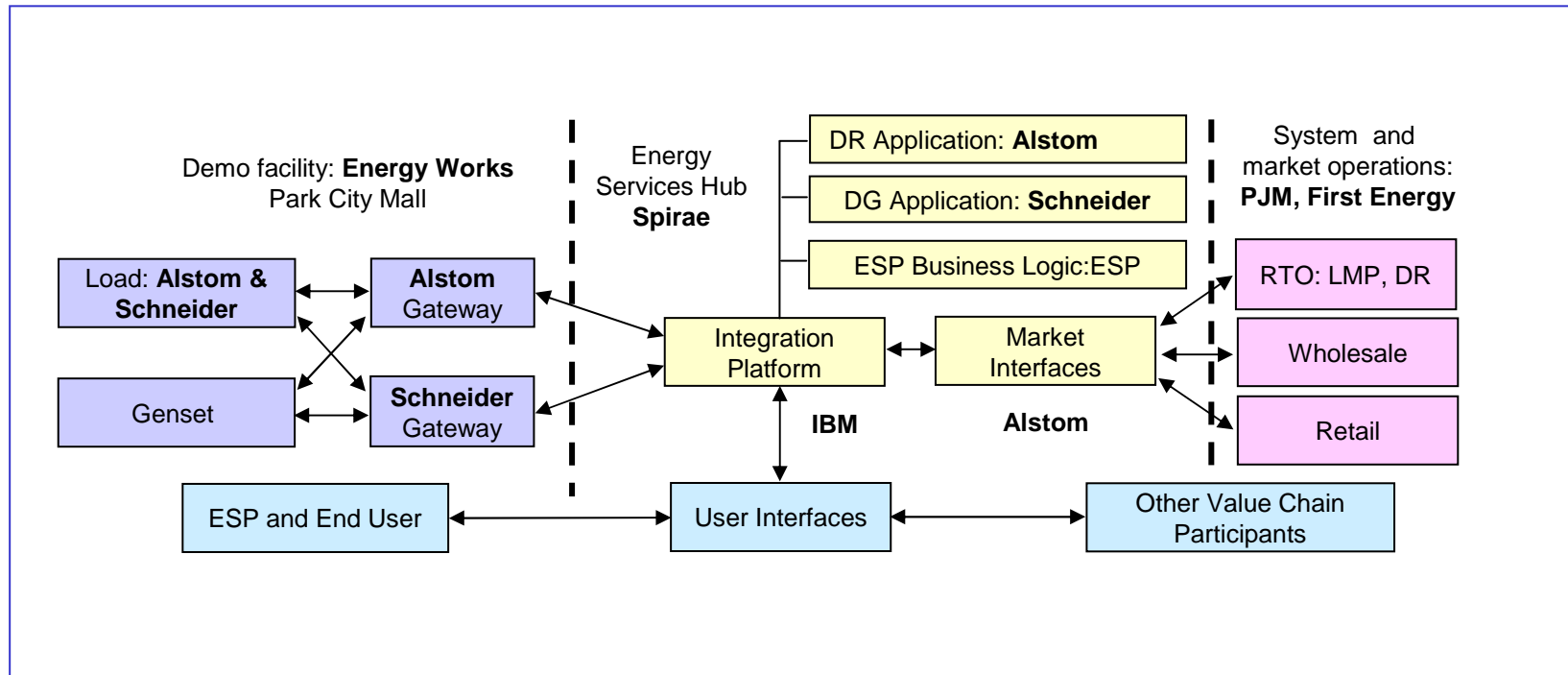
Sunil Cherian, Spirae

An integration and optimization platform that interfaces with commodity suppliers, system operators, energy service providers, end-use customers, and energy management systems, providing a seamless foundation for cost-effectively implementing best practices in energy procurement, management, and optimization.

Energy Service Hub Conceptual



Project model describing the linkages of facilities infrastructure to business systems

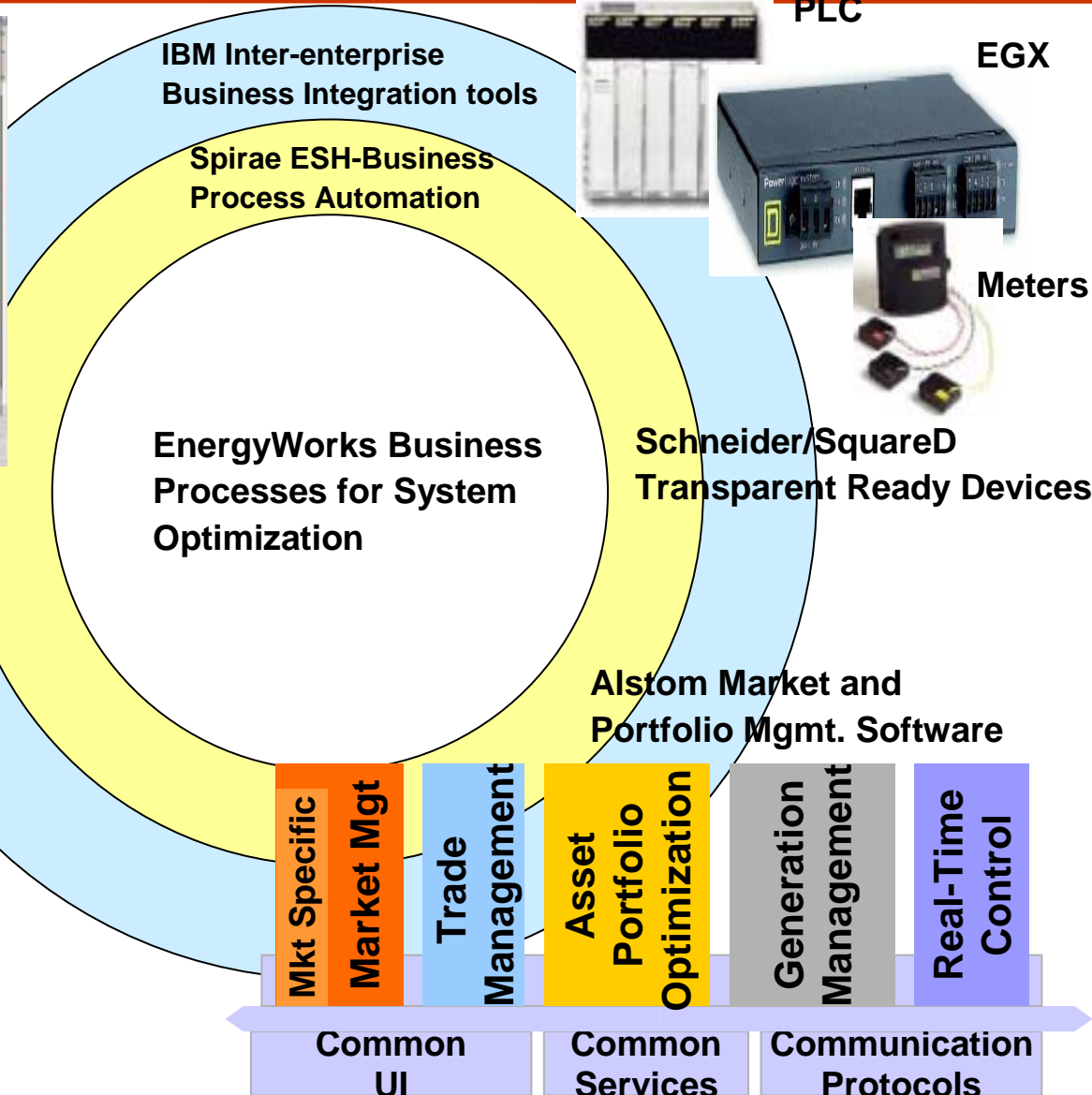




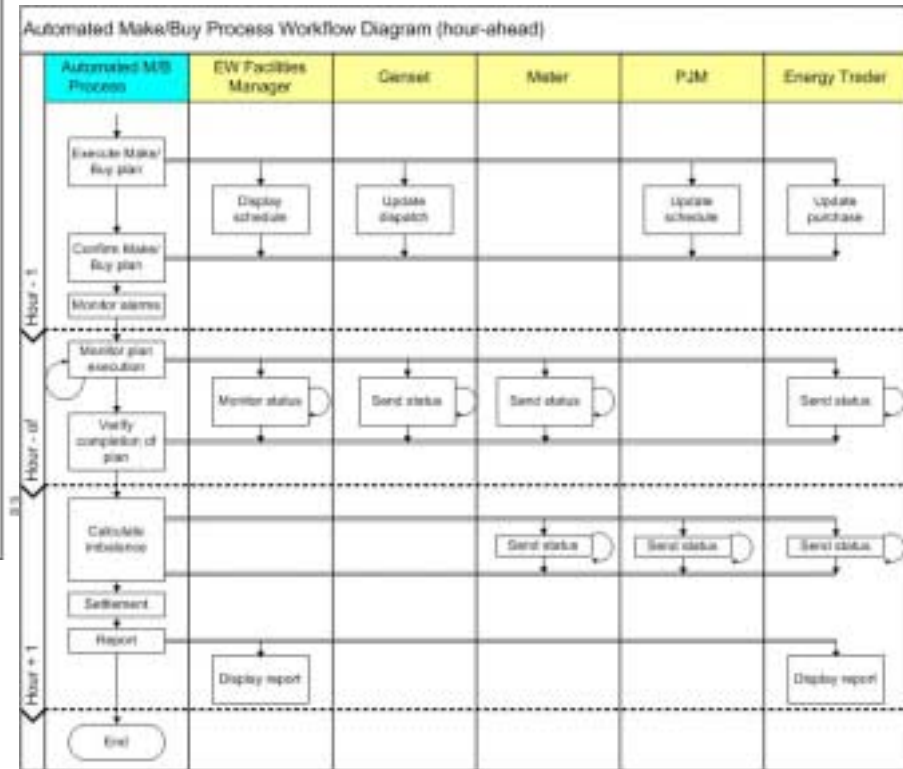
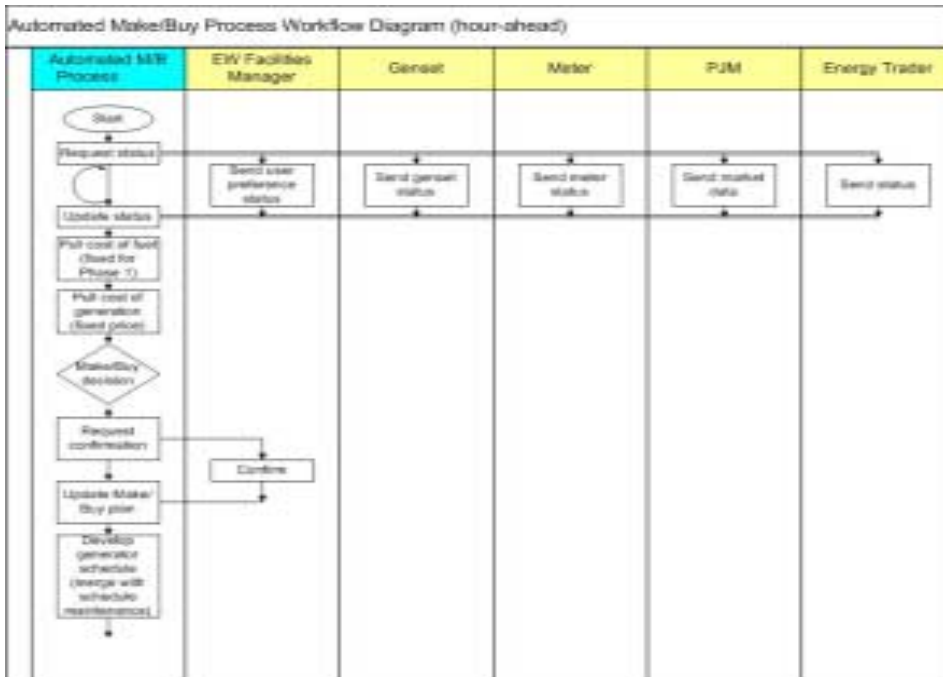
PJM eData feed (real time pricing)
Demand Response Markets

FirstEnergy

Spot power purchase



Business process flow diagram describing the automated Make/Buy process



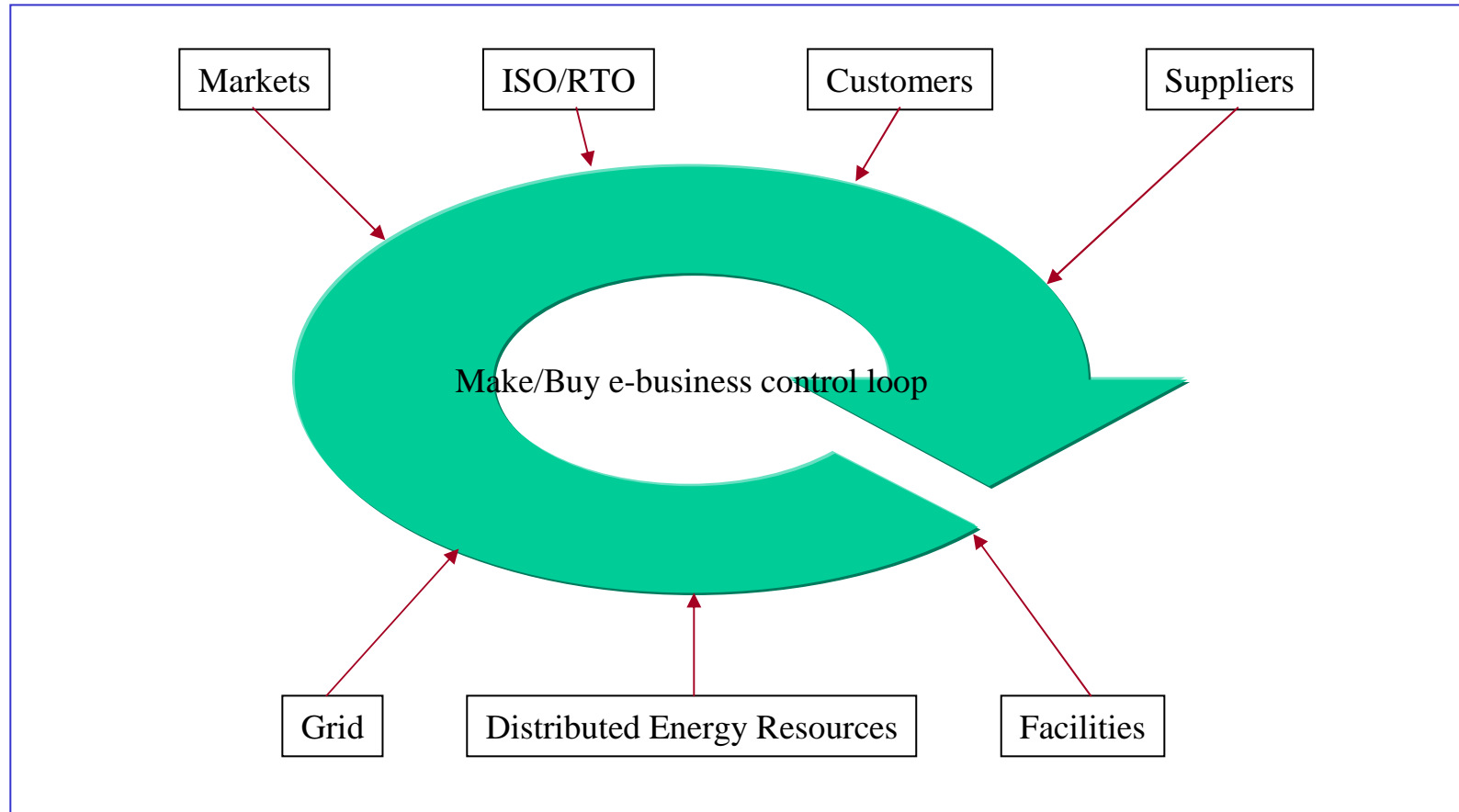
Technology Architecture

Nick Noecker, IBM

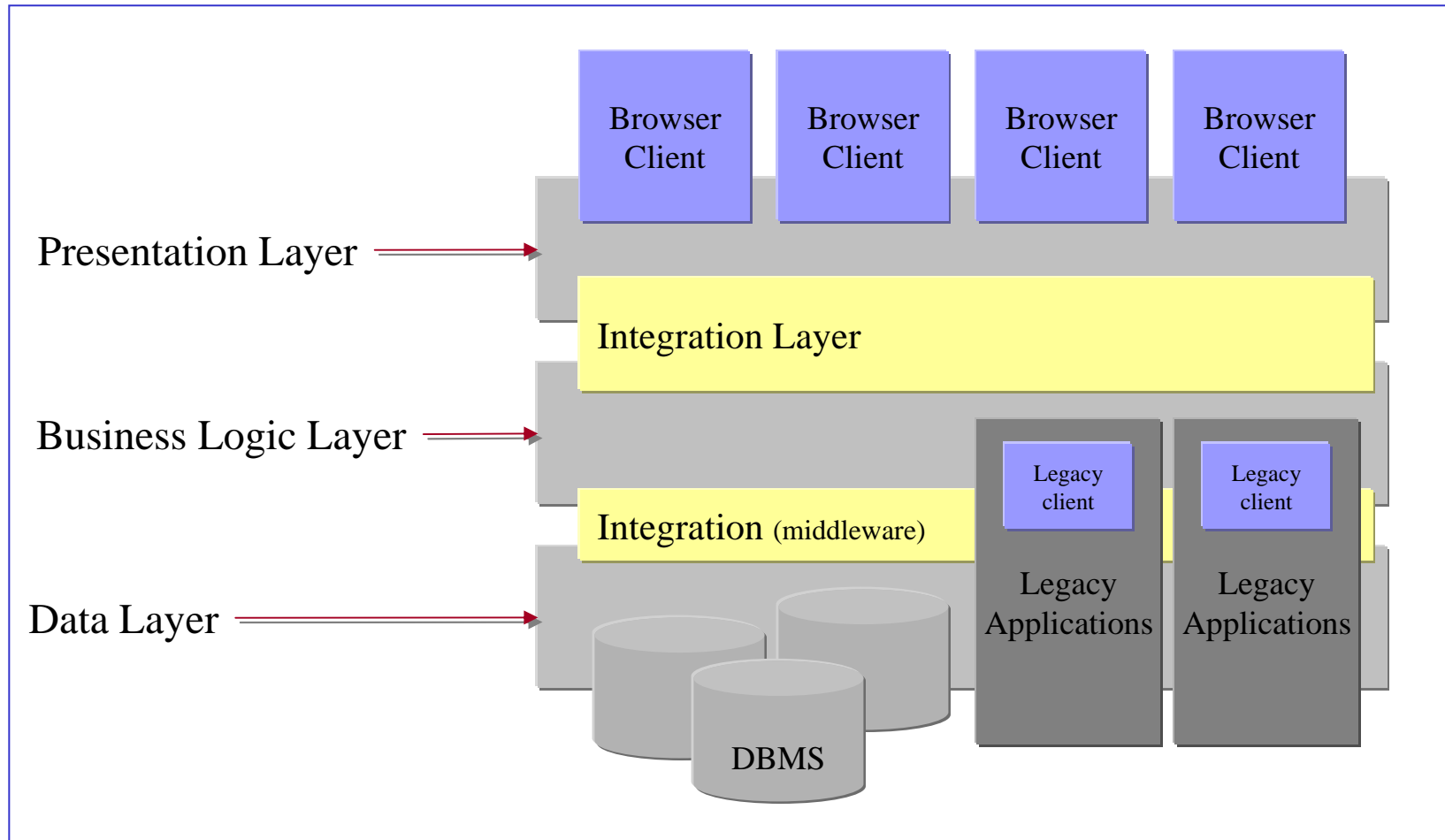
Guiding Principles...

- 1) Should be flexible – multi-platform compatibility
- 2) Must be scalable – be deployable & usable in the real world
- 3) Must be Secure-able – pragmatic
- 4) Leverage existing technologies, but invent when it advances our objectives
- 5) Be appropriate to the task at hand – keeps our eye on the ball
- 6) Should expose something new – advances-the-ball in a compelling way (e-business control loops)
- 7) Approach should be n-tier and loosely-coupled
- 8) Should accommodate a wide spectrum of user access
- 9) Budget constraints will be considered when designing the system
- 10) Architectural pattern is *e-business*

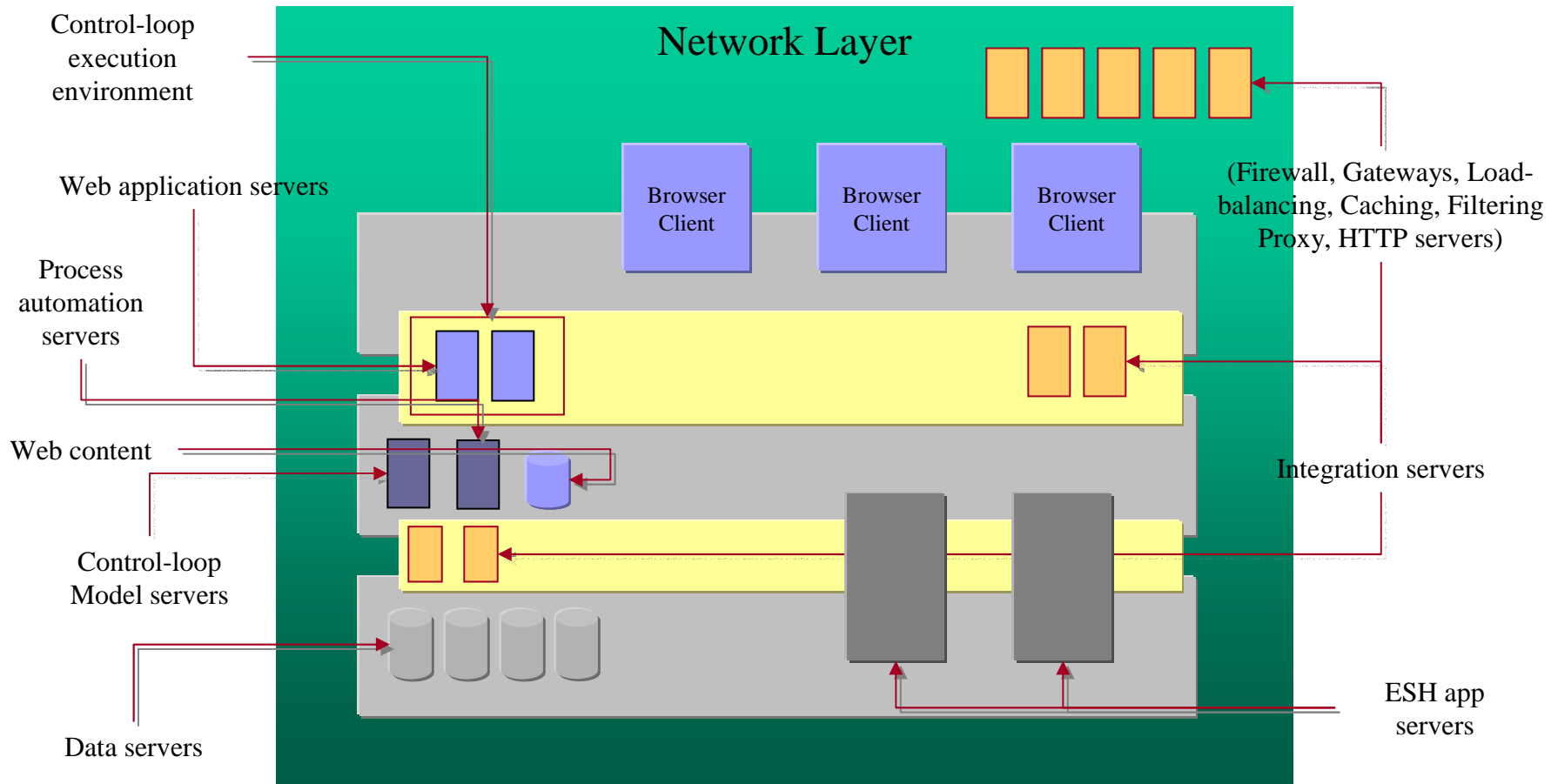
Our strategy is to connect the electricity infrastructure to e-business systems then develop software-based control models that monitor and automate business process, starting with “Make/Buy”



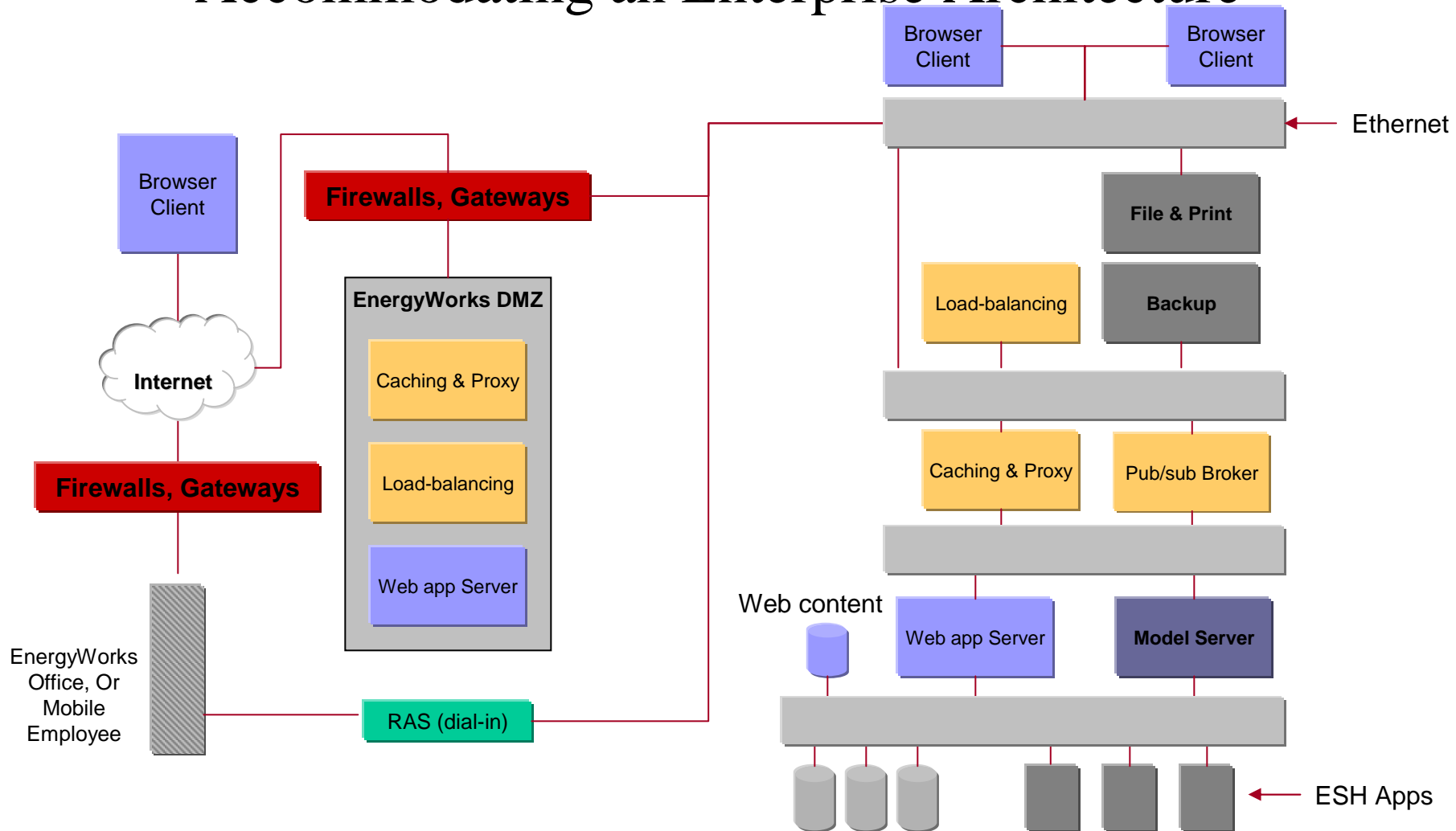
Project Architecture: n-tier, web-enabled, legacy-enabled



Location of program system components



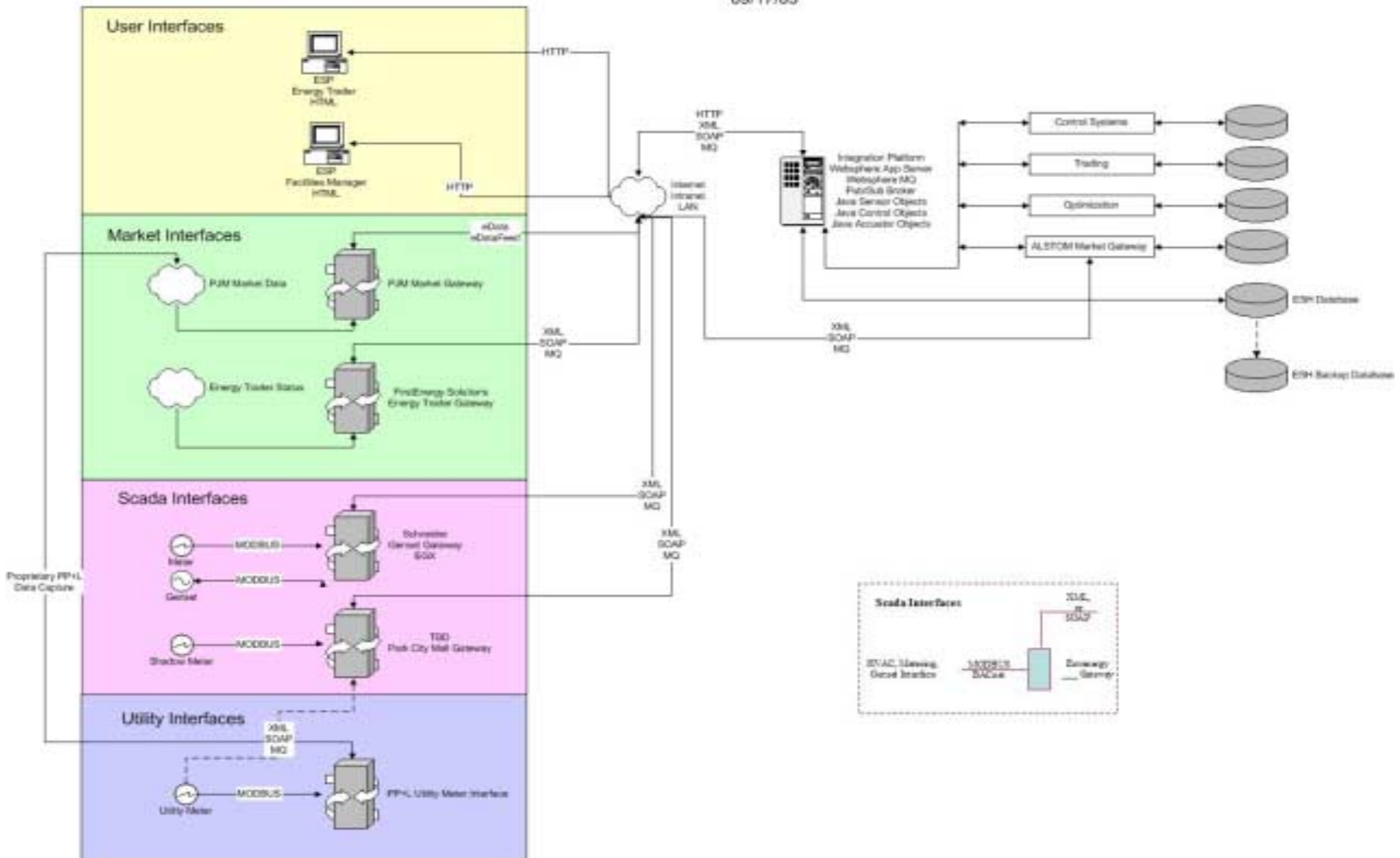
Accommodating an Enterprise Architecture



EnergyWorks Project Implementation Diagram

Phase 1

09/17/03



Project Summary

Highlights

- On Schedule and within Budget
- Team working exceptionally well together
- Phase I Testing to be completed by mid-December
- Phase II plans currently under development

Well on track to achieve DOE Objectives:

- Wholesale Interconnection (69 kV, DSR, PJM Data, eSchedule)
- Remote Monitoring & Control of ESP Operations
- Remote Monitoring & Control of GenSet
- Data Security
- Multi-vendor interoperability
- Market Evaluation Process and Decision Capabilities
- Quantification of value

— Q&A —